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cotton belt, though most of the moths die off in the autumn. The insect parasites, twelve in number, which prey upon them are described, while a large part of the Bulletin is taken up with the various remedies employed, of which Paris green, London purple, these being preparations of arsenic, are strongly advocated, and a number of machines and contrivances for sprinkling and spraying dry and liquid poisons are figured and described. The work will be of great use to cotton planters; and to entomologists the entire subject and its skillful mode of treatment will render it of permanent value.

GILBERT'S GEOLOGY OF THE HENRY MOUNTAINS.¹—The teacher as well as student of general geology in this country who would be at all informed as to the broader features of American geology and palæontology is compelled to resort to the magnificent series of reports of our geological surveys of the Western Territories. These, almost without exception, have been ably prepared, and in most respects certainly worthy of the time and money bestowed upon the work. From them have been and will be largely derived the materials for our text books. The present monograph, though not bulky, is a finished and elaborate study of an interesting group of mountains forming one of the western outlines of one of the flexures of the Rocky Mountain range, and rising suddenly from what has otherwise been a region of geological calm. This group of five elevations forms as many *laccolites*, as the author terms them. It is usual, he says, for igneous rocks to ascend to the surface of the earth and build up mountains or hills by successive eruptions. Such are volcanoes. Now, when the lava, instead of rising through all the beds of the earth's crust, stops at a lower horizon, and insinuates itself between two strata and opens for itself a chamber by lifting all the overlying strata, and here cools, forming a massive body of trap, a laccolite (*laccos*, cistern, and *lithos*, stone) is formed. This is the mode in which the Henry Mountains were formed, as well as numerous other isolated groups in the Plateau region. That many similar peaks, with the Elk mountains of Colorado, elaborately described by Messrs. Holmes and Peale, of Hayden's Survey of the Territories, were formed in an identical manner has been independently established by these geologists, as stated by our author.

Gilbert also makes the generalization that there are two types of igneous rock. "One type of rock is acidic, including porphyritic trachyte and eruptive granite, and its occurrence is, without exception, intrusive. The other type of rock is basic, including basic trachyte and basalt, and its occurrence is almost uniformly extrusive." It appears that each group of laccolites is composed

¹ Department of the Interior. U. S. Geographical and Geological Survey of the Rocky Mountain Region. Report on the Geology of the Henry Mountains. By G. K. GILBERT. Washington, 1877. (Received Nov. 10, 1879.) 4°, pp. 160. 5 plates and wood-cuts.

of many individuals, just as volcanoes are dotted over with miniature volcanets, so to speak, as may be seen on the flanks of Mt. Shasta. For example, "in the Uinkaret mountains, Major Powell has distinguished no less than one hundred and eighteen eruptive cones, and in the Henry mountains I have enumerated thirty-six individual laccolites. In one locality basic lava has one hundred and eighteen times risen to the surface by channels more or less distinct, instead of opening chambers for itself below. In the other locality porphyritic trachyte has thirty-six times built laccolites instead of rising to the surface." In answer to the question, why in some cases igneous rocks form volcanoes and in others laccolites, it is stated that "when lavas forced upward from lower lying reservoirs reach the zone in which there is the least hydrostatic resistance to their accumulation, they cease to rise. If this zone is at the top of the earth's crust they build volcanoes; if it is beneath, they build laccolites. Light lavas are more apt to produce volcanoes; heavy, laccolites. The porphyritic trachytes of the Plateau Province produced laccolites." The process of formation is thus summarized: "The station of the laccolite being decided, the first step in its formation is the intrusion along a parting of strata, of a thin sheet of lava, which spreads until it has an area adequate, on the principle of the hydrostatic press, to the deformation of the covering strata. The spreading sheet always extends itself in the direction of least resistance, and if the resistances are equal on all sides, takes a circular form. So soon as the lava can uparch the strata it does so, and the sheet becomes a laccolite." It then grows in size until the lava clogs by congelation in its conduit and the inflow stops, the irruption being completed. During the eruption and after it has ended there is an interchange of temperatures. The original laccolite thus growing by successive additions until its cooled mass, heavier and tougher than the surrounding rocks, proves a sufficient obstacle to intrusion. "The next eruption then avoids it, opens a new conduit, and builds a new laccolite at its side. By successive shiftings of the conduit a group of laccolites is formed, just as by the shifting of vents eruptive cones are grouped." Now the strata above are bent instead of broken, but though "quasi-plastic, it is none the less solid, and can be cracked open if the gap is instantaneously filled, the cracking and filling being one event. This happens in the immediate walls of the laccolite, and they are injected by dikes and sheets of the lava."

We must here remark that the impression left on the mind after having read this book, is that the discovery of this type of mountain structure is entirely due to Mr. Gilbert, although a careful reading shows that he recognized the fact that the Henry mountains are not the only examples of what he terms the "laccolite." Prof. Newberry, who examined the Sierra Abajo in 1859, was probably the first to recognize the peculiar structure,

but his examinations were rather cursory. This mountain, with others farther to the east, were carefully studied by Mr. W. H. Holmes, of the Hayden Survey, in 1875 and 1876, and his illustrations in the reports for those years show the same structure in the La Plata mountains, the Sierra Carrisso, and the Sierra El Late, in South-western Colorado and adjacent regions, with some points that do not appear in the Henry mountains, probably on account of the greater simplicity of the latter. Mr. Holmes' drawings appear to be nearer to nature, *i. e.*, less schematic. Scattered through Hayden's reports from 1873 to 1876 are many descriptions of this type of structure, and the term *Porphyritic-Trachyte* (p. 64 and 68) used by Mr. Gilbert to designate the group to which the rocks belong, was first used by Dr. A. C. Peale, of Hayden's corps, in 1874 (see his report for 1874 in Hayden's Annual Report), and afterwards he always used the term in designating the rocks.

Mr. Clarence King, in his report (Systematic Geology, 1878, p. 581), proposes the name *Trachytoid-porphyr* for the group, having recognized the resemblance of certain rocks occurring within the area of his explorations, to those of the Henry mountains. He also recognizes the peculiar petrographical position of the rocks, one extreme of which cannot be distinguished from granite, and the other of which is undoubtedly trachyte. This fact was also pointed out by Dr. Peale in 1874 and 1875 (see his reports to Dr. Hayden). The descriptions of the localities mentioned in Dr. Hayden's Annual Reports were brought together in an article (On a peculiar type of Eruptive Mountains in Colorado) in Bulletin No. 3, Vol. III, of the U. S. Geological Survey of the Territories, published May 15, 1877. Mr. Gilbert's volume is dated Washington, 1877, although it was not published until about four months ago.

BATRACHOLOGICAL PAPERS.—Prof. Peters, of Berlin, has recently published an important paper in the Berlin Monatsberichte,¹ on the *Cæciliidæ*. He discovered two new generic forms in which the usual position of the orbit is covered over by the squamosal bone, thus enclosing the rudimental eye in the fundus of the tentacular canal. One of these, *Gymnopsis*, is American; the other, *Herpele*, is African. Prof. Peters then discusses the systematic arrangement of the family, and shows that it embraces ten generic forms, seven of which are new. Among other characters he relies on the form of the tentacle, which may be valve-shaped, globular at the extremity, or acute. He finds that the generic name *Rhinatrema* was proposed on an immature *Ichthyophis*.—In another paper Prof. Peters² describes two new species of *Ædipus*, one

¹ Ueber die Eintheilung der Cæcilien, und insbesondere ueber die Gattungen *Gymnopsis* u. *Rhinatrema*. Nov., 1879.

² Monatsberichte Berliner Akademie, August, 1879.